

Rev. 1
*A Method for the Separation of Optical Fibers
by means of CO₂ Laser Radiation*

Claims

Claimed is:

1. A method for the separation of light-conducting fibers by means of CO₂ laser radiation, therein characterized,
in that selected from CO₂ laser radiation is a disengaged operative beam (8) comprised of individual pulses with the beam parameters:
 $\hat{P} = \text{some } W \leq \hat{P} \leq 1 \text{ kW},$
Pulse half value = $10^{-5} \leq \tau_{imp} \leq 10^{-4} \text{ sec}$
Pulse repetitive frequency = $100 \text{ Hz} \leq f_{imp} \leq \text{a plurality of kHz}$
and
in that the operative beam (8) is focused on a fixed light-conducting fiber and is moved back and forth in a plane along a working zone, so that per pulse, one elementary volume, which approaches equality with the product of optical penetration depth d times the incident beam cross-section, with a diameter somewhat equal to that of the focus d_f , but in any case, smaller than $2 d_f$, is taken away, until the said light-conducting fiber is completely cut through.
2. A method in accord with claim 1, therein characterized, in that, between the individual back and forth movemenets over the optical fiber, a cooling off phase in the area of 10 ... 100 ms is created, in order to assure a sufficient cooling of the working zone.
3. A method in accord with claim 1, therein characterized, in that the beaming parameters, during the operation are caused to fit the different characteristics of the raw materials of the optical fiber.

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4. A method in accord with claim 1, therein characterized, in that the light-conducting individual fibers can be of different shape and thickness, that is, they can be mono-mode and multi-mode fibers, gradient fibers or unclad fibers or clad fibers.
5. A method in accord with claim 1, therein characterized in that the method can be used for fiber bundles and fiber components.
6. A method in accord with claim 1, therein characterized, in that an elementary volume is very small, that is to say, smaller than 10^{-3} as compared to the total removal upon the complete separation and especially the optical penetration depth d made at a single overrun of the bundle by the probe is small as compared to the diameter of the fiber core (1).
7. A method in accord with claim 1, therein characterized, in that the working zone is blown with an operational gas selected for the purpose, for example, purified compressed air at about 1 bar working pressure, in order to eject the evolved material vapors from the working zone.

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